

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

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WAR DEPARTMENT,
OFFICE OF THE CHIEF SIGNAL OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In preparing this REVIEW the following data, received up to March 20th, have been used, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at 135 Signal Service stations and 13 Canadian stations, as telegraphed to this office; 192 monthly journals and 165 monthly means from the former, and 13 monthly means from the latter; 234 monthly registers from Voluntary Observers; 57 monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; Marine Reports through the co-operation of the New York Herald Weather Service; abstracts of Ships' Logs, furnished by the publishers of the New York Maritime Register; monthly reports from the local Weather Services of Iowa, Nebraska and Missouri, and of the Central Pacific Railway Company; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

To illustrate the subject of the distribution of mean atmospheric pressure over the United States and Canada for the month of February, 1882, chart No. II has been prepared, upon which are traced the lines of equal barometric mean values. The areas of lowest mean pressure 30.00, occupy the northern portion of the Upper Lake Region and the eastern half of the Canadian Maritime Provinces. The isobar of 30.05 runs southeastward from northern Dakota to southern Iowa and thence northeastward to the Province of Ontario; with a break in the line at Rockliffe, the isobar commences again near the mouth of the St. Lawrence and runs southward off the coast of Maine. Areas of 30.05 are also found in the lower portion of the Rio Grande Valley and in the North Pacific Coast Region. Throughout the remainder of the country the pressure ranges from 30.07 to 30.24. Compared with the previous month the position of the areas of lowest mean pressure remain unchanged, but the barometer has fallen about 0.05 inch in the Lake Superior region and risen about the same degree in the Maritime Provinces, accompanying a deficiency in the former and an excess in the latter region.

Departures from the Normal Values for the Month.—Compared with the means of previous years, the mean pressure for February, 1882, presents rather unusual features in the disposition and extent of areas of excess and deficiency. The central portion of the country, between the Ohio and Mississippi rivers on the east and the Rocky Mountains on the west, is occupied by a decided area of deficiency, the departures ranging from 0.01 to 0.14 inch, increasing with the latitude. From the western border of this area to the Atlantic Coast, departures of excess prevail, ranging from 0.01 to 0.13

inch. Only four stations, Eastport, Erie, Columbus, and Nashville, report the former departure, the range in general being from 0.04 to 0.09 inch; exceptional departures occur as follows: Mt. Washington, 0.13 inch; Morgantown, 0.12 inch. From the eastern border of the area of deficiency to the Pacific coast, the departures of excess range in the extremes from 0.01 to 0.09 inch, but generally from 0.04 to 0.08 inch. The following stations report a normal condition; Indianola, Galveston and Port Huron.

Barometric Ranges.—The range of pressure for the present month has generally varied from 0.8 to 1.3 inches, and in the extremes from 0.42 inch at Key West to 1.58 inches at St. Vincent, Minn., and Provincetown, Mass. The ranges increase with the latitude throughout the entire country and along the southern boundary of the United States from California and Florida inward to the maximum in Texas. Throughout the various districts the monthly barometric ranges varied as follows: New England, 1.12 inches on summit of Mt. Washington to 1.49 inches at Thatcher's Island and Eastport, and 1.58 inches at Provincetown; Middle Atlantic States, 1.15 inches at Lynchburg to 1.28 inches at Williamsport and 1.47 inches at Atlantic City; South Atlantic States, 0.84 inch at Jacksonville to 1.08 inches at Atlanta and Augusta and 1.42 inches at Hatteras and Kittyhawk; Florida Peninsula, 0.42 inch at Key West to 0.52 inch at Punta Rasa and 0.73 inch at Cedar Keys; Eastern Gulf States, 0.8 inch at Pensacola to 0.92 inch at Vicksburg and 0.93 inch at Montgomery; Western Gulf States, 0.6 inch at Mason to 0.78 inch at Shreveport, 0.97 inch at Little Rock and 0.98 inch at Fort Gibson; Rio Grande Valley, 0.62 inch at Uvalde to 0.72 inch at Rio Grande and 0.74 inch at Castroville; Ohio Valley and Tennessee, 0.95 inch at Nashville to 1.09 inches at Louisville, 1.17 inches at Pittsburg and 1.26 inches at Champaign; Lower Lake Region, 1.23 inches at Toledo to 1.33 inches at Buffalo and Detroit and 1.43 inches at Port Huron; Upper Lake Region, 1.18 inches at Chicago to 1.36 inches at Duluth, 1.37 inches at Marquette and Grand Haven and 1.56 inches at Alpena; Upper Mississippi Valley, 0.89 inch at Des Moines to 1.16 inches at St. Louis and 1.27 inches at Madison; Missouri Valley, 0.9 inch at Leavenworth to 0.92 inch at Omaha and Springfield and 1.12 inches at Huron; Extreme Northwest, 1.24 inches at Moorhead to 1.32 inches at Fort Stevenson and 1.58 inches at St. Vincent; Northern Slope, 0.54 inch at Cheyenne to 0.77 inch at Helena, 1.03 inches at Fort Keogh and 1.16 inches at Fort Assinnaboine; Middle Slope, 0.55 inch at Denver to 0.7 inch at Fort Elliott and 0.81 inch at Dodge City; Southern Slope, 0.46 inch at El Paso to 0.66 inch at Coleman and 0.89 inch at Henrietta; Northern Plateau, 0.87 inch at Fort Missoula to 1.01 inches at Lewiston and Dayton and 1.10 inches at Umatilla; Middle Plateau, 0.83 inch at Pioche to 0.89 inch at Winnemucca and 0.9 inch at Salt Lake City; Southern Plateau, 0.42 inch at Fort Grant to 0.48 inch at

Santa Fe and Camp Thomas and 0.57 inch at Prescott; North Pacific Coast, 1.03 inches at Portland to 1.35 inches at Olympia; Middle Pacific Coast, 0.72 inch at San Francisco to 0.76 inch at Sacramento and 0.83 inch at Red Bluff; South Pacific Coast, 0.43 inch at Campo to 0.57 inch at Yuma and 0.61 inch at Visalia.

Areas of High Barometer.—Eight such areas were of sufficient importance to merit description.

No. I.—Was central in Missouri at midnight of the 2d; it then moved over the Lower Lake Region and thence down the St. Lawrence Valley. The temperature fell from 10° to 14° in the northern portion of the Upper Lake Region on the 2d, and following the rise in barometer a fall in temperature of from 20° to 30° was experienced in the Lower Lake Region, St. Lawrence Valley and New England.

No. II.—Highest in Wyoming on the 3d; in New Mexico on the morning of the 4th, and in Texas on the afternoon and night of Sunday; remained highest in the Gulf States during the 5th. The area of highest pressure moved into the South Atlantic States on the 6th; remained high there during the 7th, and extended into the Middle Atlantic States on the 8th, and into New England on the 9th. Midnight map of the 4th showed higher temperature in all districts west of the Mississippi; midnight of the 5th, temperature generally higher in all districts. In the Mississippi Valley and districts to east of it still higher at midnight of 6th, and continued to rise in New England, the Middle, South Atlantic and Gulf States on the 7th. The extreme southern course of this area of high barometer produced a preponderance of southerly winds and a general increase of temperature during its progress.

No. III.—Entered the United States in Washington Territory on the 6th, and on the 7th reached the Missouri Valley, highest pressure, 30.40 inches at Yankton. This area of increased pressure then passed northeastward to Nova Scotia, accompanied by a fall in temperature of from 10 to 30 degrees. The cold wave reached the Missouri Valley on the 6th; on the 7th extended over the Upper Lake Region and the Mississippi Valley, and passed over the Lower Lake Region and the Middle Atlantic States on the 8th.

No. IV.—An area of increased pressure entered Texas on the 8th. Barometer highest in this State on the 9th; at Pittsburgh midnight of the 10th; on the Middle Atlantic coast on the 11th and remained highest in the Middle and South Atlantic States during the 13th. The temperature fell from 10° to 16° in Texas on the 8th; generally in the Middle and South Atlantic States on the 9th, and in New England, the Middle and South Atlantic States on the 10th.

No. V.—The barometer rose 0.15 inch on the California coast during the night of the 10th. This area of increased pressure passed northeastward reaching Nova Scotia on the 14th. The pressure was highest in Colorado on the 13th; at Cairo on the morning of the 14th; extended to the South Atlantic States during the day, and there remained highest during the 15th. The following are the changes in temperature during the passage of this area: 11th, decided fall in California, Nevada and Utah. Cold wave reached the Mississippi Valley on the 12th; extended over Lower Lake Region, Ohio Valley and Tennessee on the 13th, and to New England and the Middle Atlantic States on the 14th.

No. VI.—Increase of pressure first felt in Montana on the 15th; passed to the east and reached the Atlantic coast on the 18th. At midnight of the 15th the temperature had fallen in the Extreme Northwest and Montana from 10° to 40° in last 24 hours. This cold wave covered the Upper Mississippi and Missouri Valleys and the Lake Region on the 16th, and had reached New England and the Middle and South Atlantic States on the 17th, where the fall continued during the 18th.

No. VII.—Passed from the Pacific coast and was central near Yankton on the morning of the 19th; barometer at this station 30.56. Morning of the 20th highest in Manitoba. The area of increased pressure passed thence eastward to the Atlantic coast. At midnight of the 18th the temperature

had fallen from 10° to 20° in the Missouri Valley, and during the next day the cold wave extended over the Mississippi Valley, Kansas and Indian Territory. Afternoon of the 19th the temperature at Fort Gibson 10°, a fall of 55° in 24 hours. 20th, fall of from 10° to 35° in Texas, and 6° to 17° in the Lake Region.

No. VIII.—This area moved from the coast of California to Texas, where it was central on the morning of the 21st. Morning of 22d highest in Arkansas and Missouri. 23d, extended from St. Paul to Leavenworth. 24th, an area of 30.50 inches covered the Lake Region, Tennessee and the Ohio Valley. 25th, highest at Pittsburgh. 26th, highest over Virginia, North and South Carolina; pressure decreased during the day. Morning of the 27th, highest barometer 30.30 at Baltimore. Morning of the 28th, an area of 30.40 extended over New England and the Canadian Maritime Provinces. The following changes in temperature were noted during the passage of this area: morning of the 21st, fall of 13° to 30° in Texas; 10° to 20° in the East Gulf States and Tennessee and in the Mississippi and Missouri Valleys. Morning of the 22d cold wave covered all stations east of the Mississippi; Pittsburgh, 25°, a fall of 32°; Charlotte, N. C., 37°, a fall of 25°. In the South Atlantic States the temperature continued to fall during the 23d and 24th.

Areas of Low Barometer.—Eleven areas of barometric minima appeared within the limits of the Signal Service weather maps during the month of February, 1882, all of which merit description.

No. I.—Passed from Lake Superior to the St. Lawrence Valley on the 1st, causing high SW. winds in the Lower Lake Region.

No. II.—Followed immediately after No. I; was central north of Lake Superior on the morning of the 2d and passed to the eastward accompanied by very little precipitation. Southwest winds prevailed during the day in New England, the Middle Atlantic States and Lower Lake Region and had generally veered to NW. by morning of the 3d. Velocities of 28 to 34 miles were recorded in the Lower Lake Region and from 26 to 35 on the New England coast. The following reports furnished through the co-operation of the New York Herald Weather Service, probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Vaderland*, 5th, in 47° 47' N., 38° 02' W., 29.33, a fall of 0.67 inch, W. to NE., heavy gale with high sea and rain; 6th, in 47° 10' N., 42° 05' W., 29.08, W. to WSW., strong gales, heavy sea, thunder and lightning; 7th, in 46° 21' N., 44° 38' W., 29.27, WSW. to WNW., heavy gale with tremendous sea. S. S. *Arizona*, 4th, in 43° 58' N., 54° 20' W., variable to NW., strong breeze, overcast and high head sea; 5th, in 42° 10' N., 62° 24' W., NW. to SW., strong gale increasing to hurricane, dangerous sea; 6th, in 41° 22' N., 63° 25' W., W., strong gale with high head sea. S. S. *City of Brussels*, 4th, in 42° 44' N., 53° 54' W., SSW. to NW., strong breeze to fresh gale; 5th, in 41° 59' N., 60° 22' W., fresh to strong gale, heavy snow; 6th, in 41° 33' N., 61° 40' W., SSE. to SW. and W., hurricane for 12 hours, followed by heavy gale from W.; 7th, in 41° 02' N., 66° 18' W., NW., strong breeze, very heavy squalls, high sea, followed on the 8th by fine weather. S. S. *W. A. Scholten*, 4th, in 43° 32' N., 53° 14' W., 29.38, a fall of 0.74 inch in past 24 hours, NW., force 8, high sea; 5th, in 42° 37' N., 57° 24' W., 29.71, ESE., force 4, very high sea; 6th, in 41° 57' N., 58° 47' W., 29.42, NW., force 10, very high sea, stormy; 7th, in 41° 09' N., 61° W., 30.20, NW., force 8, very high sea, stormy. S. S. *P. Caland*, 9th, in 49° 44' N., 22° 38' W., 29.00, a fall of 0.94 inch, WSW., force 6. Ocean data from other sources as follows: S. S. *Athos*, 3d, 11 p. m., in 37° N., 74° W., violent storm from NE., barometer 30.40; wind gradually increased and hauled to E. with rapidly falling barometer accompanied by torrents of rain. 4th, barometer 29.65, wind shifted to SE. blowing a heavy gale with high sea and much rain; noon, wind suddenly shifted to WSW. with increased violence, hard squalls and rain; 2 p. m., wind backed to S. and at 8 p. m. shifted to W. still very violent with heavy rain and terrific sea; 6 p. m., gale increased to

hurricane and settled down from W. with clearing weather, barometer 29.18. 5th, 3 a. m., in 34° N., 74° W., gale continued as hard as ever with tremendous high sea, barometer rising gently and at midnight reached 30.30 with fine clear weather. S. S. *Belgenland*, 4th, in 40° 23' N., 73° 13' W., violent gale accompanied with heavy snow and rapidly falling barometer, wind started at NE. shifting to N. and NW., blowing with great violence, barometer 28.70 at 3 p. m. At 10 p. m. perfectly calm when suddenly without any warning gale sprang up from the SW. and blew violently for about 2 hours when it again shifted to NW. and blew a heavy gale, sea very high, barometer steadily rising. S. S. *Muriel*, 4th, off Highlands, New Jersey coast, heavy E. wind with threatening weather and snow; gale steadily increased and during the night became a most violent storm, accompanied with heavy snow. Barometer fell steadily and on morning of the 5th, reached 29.05 when wind suddenly shifted to NW. and WNW. followed by clearing weather.

Nos. III and IV.—The morning map of the 3d showed No. III central in Manitoba and No. IV near Galveston. The northern storm produced but slight changes and lost its identity on the afternoon of the 4th; at this time No. IV was central near Norfolk, Va. Barometer at that station 29.31 inches, a fall of 0.81 inch in last 24 hours. The following are the weather conditions noted during the passage of this storm: In the West Gulf States, heavy rains on the 2d and 3d, generally clear at midnight of 3d, with wind NW.; East Gulf States, heavy rains 3d and 4th, clear, with NW. winds at midnight of 4th; South Atlantic States, rain on 4th; Middle Atlantic States, NE. winds and heavy snow on 4th, clearing and winds westerly on 5th; New England, snow on 4th and 5th. The following velocities were recorded: Galveston, NW. 40; Indianola, NW. 51; Pensacola, SW., 36; Cedar Keys, W. 38; from 30 to 42 on the South Atlantic coast; 60 miles at Cape Hatteras and Cape May; 64 miles at New Shoreham and 28 to 40 miles on the New England coast. The following ship's report probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Iberian*, 6th, in 47° 30' N., 43° 38' W., 29.15, wind unsteady from SW. to SE. Barometer continued falling and on the 8th, in 50° 38' N., 30° 20' W., wind hauled to E., with heavy rain; 8 p. m., wind backed to SW. with increasing force, and on the following morning blew a hurricane for about 3 hours, when it moderated with fine clear weather by noon.

No. V.—Was central on the morning of the 6th near Fargo. Weather generally fair in all districts. On the 7th it rained in the Lower Lake Region, Tennessee and the Ohio Valley, and snowed in the northern portion of New England. In the Middle Atlantic States, rain fell during night of the 7th. Velocities of 28 to 32 miles were recorded in the Lake Region and from 25 to 31 miles on the New England coast. The following reports furnished through the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Vaderland*, 8th, in 45° 39' N., 47° 19' W., 29.74, WNW., heavy gale with very high sea, vessel slowed, shipping heavy water; 9th, in 45° N., 51° 05' W., 29.51, SSE. to NW., moderate gale, changing suddenly to complete cyclone with terrible sea, vessel severely damaged; 10th, in 44° 07' N., 54° 53' W., 29.47, NW. to SE., heavy gale, terrible sea; 11th, in 42° 51' N., 57° 32' W., 29.32, SE. to NNE., terrific gale ending in a complete revolving storm, violent sea; 12th, in 42° 30' N., 59° 24' W., 30.50, NNE. to N., terrible gale with tremendous sea; 13th, in 41° 34' N., 64° 10' W., 30.32, N. to WSW., wind and weather moderate, sea smooth. S. S. *City of New York*, 9th, in 44° 22' N., 44° 45' W., N. to S., strong breeze to strong gale, high head sea; 10th, in 43° 41' N., 47° 29' W., S. to NW., strong gale to light breeze, very high head sea. S. S. *Celtic*, 8th, in 43° 24' N., 53° 18' W., WNW., strong gale, heavy head sea; 9th, in 42° 16' N., 58° 22' W., NNW., strong gale, high head sea; 10th, in 41° 10' N., 65° 13' W., SW., strong breeze with rain. S. S. *Catalonia*, 8th, in 45° 42' N.,

53° 29' W., WNW. and NW., strong gale; 9th, in 45° 27' N., 57° 45' W., NW., heavy gale, high sea. S. S. *P. Caland*, 12th, in 48° 49' N., 34° 37' W., 29.24, a fall of 0.56 inch, WSW., force 9, heavy squalls with rain.

No. VI.—This area appeared central near Brownsville, Texas, at midnight of the 7th. It rained during the night in the Gulf States. General and heavy rains occurred in the South Atlantic States, Tennessee and the Ohio Valley on the 8th, and in the Middle Atlantic and New England States on the 9th. Velocities noted: 26 to 32 miles at Gulf stations; 34 to 48 miles on South Atlantic coast and 28 to 46 miles on the Middle Atlantic and New England coasts. The following reports furnished through the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Abyssinia*, 10th, in 47° 29' N., 40° 06' W., WNW., heavy gale, snow and hail showers, high sea; 11th, in 45° 59' N., 45° 40' W., westerly, fresh to moderate gale, squalls and showers of rain and hail; 12th, in 44° 46' N., 48° 50' W., W. to NNW., strong gale, very high confused sea, cold, frosty weather. S. S. *Gallia*, 11th, in 43° 46' N., 48° 53' W., S. to W., fresh gale to moderate breeze and head sea; 12th, in 42° 54' N., 52° 45' W., W. to NW., strong gale and high confused sea; 13th, in 41° 55' N., 59° 20' W., N. to NW., fresh breeze and head sea. S. S. *City of New York*, 11th, in 42° 38' N., 52° 25' W., S. to W., light breeze to strong gale, very high head sea; 12th, in 42° 16' N., 56° W., W. by S. to NW., strong gale and high confused sea; S. S. *Catalonia*, 10th, in 44° 33' N., 62° 45' W., wind shifted from NW., to WSW. and E., strong gale, heavy snow, stopped engines, ship drifting. S. S. *Republic*, 10th, in 40° 37' N., 68° 16' W., 29.26, W. by S., force 2, drizzling rain; 11th, in 41° 13' N., 61° 01' W., 29.82, NW., force 7, overcast, snow and hail; 12th, in 41° 42' N., 53° 14' W., 30.31, NNW., force 6, cloudy, snow and hail.

No. VII.—Was central near Bismarck on the afternoon of the 10th, having moved from Washington Territory in past 24 hours. Rain fell in the Upper Mississippi Valley on the 11th, and in Texas during the night of the same day. General rains occurred in the Lower Lake Region, Tennessee and the Ohio Valley and the East Gulf States on the 12th and 13th. In the New England and Middle Atlantic States on the 13th and in the South Atlantic and East Gulf States on the 14th. The following reports furnished through the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Abyssinia*, 14th, in 42° 42' N., 60° 13' W., WSW., fresh gale, heavy rain and high head sea; 15th, in 41° 06' N., 65° 53' W., westerly, moderate to light winds, fine weather and moderate sea. S. S. *Zeeland*, 14th, in 47° 33' N., 39° 13' W., 30.02, a rise of 0.28 inch in past 24 hours, WNW. to NW., strong breeze with heavy squalls, high head sea, clear; 15th, in 46° 51' N., 43° 17' W., 29.90, W. to WSW. and NW., strong fresh breeze, sea moderating, by noon light rain; 16th, in 46° N., 49° 11' W., 29.88, N. and NE., moderate to fresh breeze, light snow squalls at intervals. Ocean data from other sources as follows: S. S. *Mississippi*, 9th, in 48° 17' N., 123° 55' W., near entrance to Straits of Juan de Fuca, took heavy gale commencing at NE. with heavy snow. Wind backed gradually around to WNW., when it moderated and cleared. Shortly after, barometer fell rapidly to 28.90, remaining steady until about noon, when it commenced rising and at 3 p. m. stood at 29.65, where it remained steady for 24 hours. Sea from SSE., high and confused; wind throughout the storm between WNW. and NE. Course, a little north of west out of the straits; when south of entrance about 20 miles gale moderated. Barometer continued falling until course was changed to S., when it remained stationary for about 3 hours, rising thereafter as suddenly as it fell.

No. VIII.—Central in southern Wisconsin at midnight of the 15th; moved northeast to the St. Lawrence Valley, and thence southeast, passing off the coast of Maine. During the night of the 16th, rain fell in the Middle Atlantic States and

the Lower Lake Region, and snow in New England on the 16th and during the night of the same day. High winds occurred on the North Atlantic coast after the passage of the centre. The following reports furnished through the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Waesland*, 18th, in 46° 46' N., 38° 52' W., 29.62, a fall of 0.36 inch in past 24 hours, NE. to SE., partly cloudy, with rain during latter part of day; 19th, in 45° 05' N., 45° 42' W., 29.42, SSW., overcast and smooth sea; 20th, in 43° 29' N., 50° 40' W., 29.91, NNW., strong, overcast with snow squalls: S. S. *City of Montreal*, 17th, in 42° 26' N., 60° 18' W., W. to SSW., light breeze, clear; 18th, in 41° 06' N., 65° 35' W., SW. to NW. and N., fresh wind to fresh gale, heavy rain changing to snow, heavy beam sea. S. S. *Britannic*, 16th, in 44° 31' N., 47° 50' W., W. and N., fresh breeze and overcast; 17th, in 42° 53' N., 56° 26' W., variable, light breeze and fine; 18th, in 41° 43' N., 63° 34' W., 29.89, a fall of 0.91 inch in past 24 hours, S. and N., hard gale and high sea. S. S. *Servia*, 18th, in 42° 50' N., 55° 36' W., southerly, moderate breeze; 19th, in 41° 23' N., 62° 08' W., northerly, strong gale and heavy squalls. S. S. *Zeeland*, 17th, in 44° 38' N., 54° 01' W., 29.80, NW. to W. and SW., light breeze and dense fog throughout the whole 24 hours; 18th, in 43° 36' N., 57° 30' W., 29.74, SW. to W. and NNW., fierce gale, tremendous sea, occasional snow squalls; 19th, in 42° 26' N., 59° 28' W., 29.88, northerly gale, weather and sea moderating. S. S. *Celtic*, 17th, in 40° 41' N., 69° 46' W., 29.57, SW., force 4, foggy; 18th, in 41° 04' N., 62° 40' W., 29.95, NW., force 6, cloudy; 19th, in 41° 51' N., 55° 29' W., 29.75, NW., force 6, cloudy.

No. IX.—Was central in Colorado on the morning of the 18th. Rain fell during the day in the Upper Mississippi Valley and Upper Lake Region. The rain area moved eastward into New England and the Lower Lake Region during the 19th, and on the same day heavy and general rains occurred in the Ohio Valley and Tennessee. The following reports furnished by the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Waesland*, 21st, in 42° 19' N., 57° 19' W., 29.93, strong easterly winds, overcast with snow squalls: S. S. *Zeeland*, 20th, in 41° 20' N., 64° 07' W., 29.64, a fall of 0.24 inch in past 24 hours, N. to SW., calm, cloudy; 21st, in 40° 47' N., 69° 11' W., 29.70, N. to ENE. and ESE., light to fresh breeze with occasional rain. S. S. *Wisconsin*, 19th, in 43° 39' N., 53° 54' W., N. to W., heavy gale and snow; 20th, in 42° 23' N., 59° 54' W., N. to E., moderate gale, snow and heavy head sea; 21st, in 40° 48' N., 66° 18' W., N. to SE., gales and snow. S. S. *Assyrian Monarch*, 19th, in 41° 50' N., 63° 45' W., N., heavy gale and high sea.

No. X.—Central in Texas at midnight of the 19th, with heavy rains in West Gulf States. The rain of the 19th, in Tennessee and the Ohio Valley, continued during the 20th. This day rain fell in Lower Lake Region and Middle Atlantic States, and snow in the Upper Lake Region. On the 21st it rained in Tennessee and the Middle Atlantic States, and snow fell in the Ohio Valley, the Lower Lake Region and in New England. Snow continued in the Lake Region and New England on the 22d and 23d, the weather generally clearing in the other districts.

The following reports furnished through the co-operation of the New York Herald Weather Service probably indicates the presence of this storm during its passage eastward over the ocean: S. S. *Waesland*, 22d, in 41° 35' N., 63° 46' W., 29.14, a fall of 0.79 inch in past 24 hours, ESE., partly cloudy changing to stormy weather; 23d, in 40° 44' N., 64° 54' W., 29.48, W., heavy gale with high head sea, ship laboring heavily; 24th, in 40° 17' N., 71° 01' W., 29.96, N., moderating, snow squalls. S. S. *Helvetia*, 22d, in 45° 38' N., 44° 48' W., NE., strong breeze and beam sea; 23d, in 42° 58' N., 50° 20' W., variable, light winds and cloudy; 24th, in 42° N., 55° 10' W., variable, moderate gale and snow squalls; 25th, in 41° 03' N., 60° 57' W., N. to NNE., moderate gale and snow squalls. S. S. *The Queen*, 22d, in 40° 28' N., 69° 42' W., SE. to WNW., heavy head sea and rain. S. S. *Parthia*, 24th, in 46° 13' N., 42° 58'

W., SSW. to WSW. and SE., moderate breeze, cloudy with rain and confused sea. S. S. *Zeeland*, 22d, in 46° 29' N., 73° W., 29.58, a fall of 0.12 inch in past 24 hours, SE. to W. and WNW., strong breeze, rainy and misty. S. S. *Baltic*, 21st, in 43° 03' N., 51° 15' W., W. and NE., variable, cloudy, confused sea; 22d, in 42° 16' N., 58° 55' W., variable, strong winds, squally, rough sea; 23d, in 41° 39' N., 62° 57' W., NW. and N., strong gale, heavy head sea.

No. XI.—Moved down the Missouri Valley on the 27th; on the morning of the 28th it was central near Little Rock, and thence moved NE. to the Lake Region. Heavy and general rains occurred during the passage of this storm in the Mississippi Valley, Tennessee and the Ohio Valley, the East Gulf States, the Lake Region, the Middle Atlantic and New England States.

INTERNATIONAL METEOROLOGY.

International charts Nos. IV and V accompany the present REVIEW for February, 1882. The former is published for December, 1879, and continues the series of that chart, commenced in January, 1877. The "Beobachtungen auf dem Nordatlantischen Ocean" for December, 1879, kindly furnished this office through the courtesy of Prof. Dr. G. Newmayer, Director of the German Marine Observatory, has been used in the preparation of the present chart. Chart No. V is prepared for the month of March, 1880, and continues the series of this chart, commenced in November, 1877.

Chart No. IV shows the mean pressure, temperature and the prevailing direction of the wind at 7.35 a. m. Washington, or 0.43 p. m. Greenwich mean time, for the month of December, 1879, over the Northern, and at certain isolated stations in the Southern, Hemisphere. The pressure is generally high, even over British India, where the mean at no station falls below 29.92. There are two areas of comparative barometric minima, one embracing Iceland and Greenland and the other occupying northeastern Russia and northwestern Siberia. The most decided of the above indicated depressions is the former, lowest mean reading 29.47, at Stykkisholm. This area of barometric minima probably resulted from the translation northward of one of the November depressions (29.90) central over the Azores and Madeira Islands, and its combination with a slight depression (29.80) central that month over Greenland. There are five principal areas of high pressure for the month, distributed as follows: In central Mexico, 30.30; in Manitoba, 30.20; in 35° N., 70° W., 30.20; in western Europe, 30.40; in southeastern Siberia, 30.40. The extreme mean pressures for the month are, 29.47 (lowest) at Stykkisholm and 30.49 (highest) at Nertschinsk. The extreme monthly range of mean pressure for the month is 1.02 inches, which is 0.52 inch smaller than the range for December 1877, and 0.18 inch smaller than the range for the same month in 1878. The following extreme monthly mean temperatures are given in Fahrenheit's scale: *Lowest*: York Factory, -31°; Fort Garry, -18°; Moose Factory, -16°; Nertschinsk, -12°; Fort Buford, -8°; Bismarek, -5°; Nikolaievsk, -3°; Yeniseisk, 1°; Ekaterinburg, 3°; Kasan, 8°; Archangel, 10°; Godthaab, 14°; Szathmar, 16°; Bamberg and Haparauda, 17°; Zurich, 19°. *Highest*: Mauritius, 30°; Paramaribo, 79°; Santiago, Cape Verde Islands and Fort Napier, 78°; Pooná and Bridgetown, 77°; Fort de France, Navaassa and Bombay, 76°; Kingston, Jamaica, Santiago de Cuba and San Juan de Puerto Rico, 74°; Honolulu, 71°; Tlacotalpam, 70°. The prevailing direction of the winds over the United States was *southwesterly* in the Atlantic coast States, except *westerly* in New England; *southerly* from the Gulf coast northeastward to the Lakes; *northwesterly* in the Lake Region, Upper Mississippi and Lower Missouri Valleys, Rocky Mountain Slopes and in western Texas; *southerly* in the northern Pacific Coast Region and variable in the Middle and Southern Pacific Coast and Plateau Regions. In Canada and the Maritime Provinces, *westerly*. In Central Mexico, *variable*. Over the Atlantic Ocean from the American coast eastward to 40° W.,